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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

BELLO, AGUSTIN

ART UNIT

PAPER NUMBER

2613

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Please find below and/or attached an Office communication concerning this application or proceeding.

57

<b>Office Action Summary</b>	<b>Application No.</b> 09/853,323	<b>Applicant(s)</b> HOSHIDA ET AL.	
	<b>Examiner</b> Agustin Bello	<b>Art Unit</b> 2613	

**– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –  
Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 04 May 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/30/06</u> . | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Response to Appeal Brief***

1. Applicant's appeal of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-6, 8-9, 11-18, 20-21, 23-24, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitajima (U.S. Patent No. 5,515,196) in view of Du (U.S. Patent No. 6,417,958).

Regarding claim 1, 13, 23, and 26, Kitajima teaches modulating a non-intensity characteristic of an optical carrier signal with a data signal (reference numeral 13-10a in Figure 32) to generate an optical information signal; transmitting the optical information signal over an optical link (e.g. output of phase modulator 13-10b in Figure 32), and amplifying the optical information signal over a length of the optical link (reference numeral 102 in Figure 11). Kitajima differs from the claimed invention in that Kitajima fails to specifically teach that the optical information signal is amplified with a co-launched amplification signal traveling in a same direction as the optical information signal in the optical link. However, Du, in the same field of optical communication, teaches that it is well known in the art to amplify an optical information signal over a length of an optical link with a co-launched amplification signal

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traveling in a same direction as the optical information signal in the optical link (see abstract).

One skilled in the art would have been motivated to amplify an optical information signal over a length of an optical link with a co-launched amplification signal traveling in a same direction as the optical information signal in the optical link in order to provide for a reduction of signal-pump-signal cross talk (column 3 lines 31-37). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to amplify an optical information signal over a length of an optical link with a co-launched amplification signal traveling in a same direction as the optical information signal in the optical link as taught by Du in the system of Kitajima.

Regarding claim 2 and 14, the combination of Kitajima and Du teaches that the co-launched amplification signal travels at a substantially same speed as the optical information signal (e.g. both signals being light signals, they each travel near the speed of light).

Regarding claim 3 and 15, the combination of Kitajima and Du teaches that the co-launched amplification signal comprises a wavelength lower than that of the optical information signal (column 7 lines 32-34 of Du).

Regarding claim 4 and 16, the combination of Kitajima and Du teaches that the optical information signal is amplified over the length of the optical link with the co-launched amplification signal by distributed Raman amplification (DRA) (as noted in the abstract and seen in Figure 4 of Du).

Regarding claim 5 and 17, the combination of Kitajima and Du teaches generating a plurality of optical information signals (reference numeral 110 in Figure 11 of Kitajima) each comprising a wavelength distinct carrier signal having the non-intensity characteristic modulated with a data signal (reference numeral 13-10a in Figure 32 of Kitajima), multiplexing the plurality

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of optical information signals to generate a wavelength division multiplexed (WDM) signal (reference numeral 112 in Figure 11 of Kitajima) , transmitting the WDM signal over the optical link (reference numeral 101 in Figure 11 of Kitajima); and amplifying the WDM signal over the length of the optical link (reference numeral 102 in Figure 11 of Kitajima) with a plurality of co-launched amplification signals transmitted in the same direction as the WDM signal (see abstract of Du).

Regarding claim 6, 18, and 24, the combination of Kitajima and Du teaches that the phase of the optical carrier is modulated with the data signal (reference numeral 13-10a in Figure 32 of Kitajima).

Regarding claim 8 and 20, the combination of Kitajima and Du teaches further amplifying the optical information signal over a second length of the optical link with a counter-launched amplification signal traveling in an opposite direction as the optical information signal and the co-launched amplification signal (Figure 13 of Du).

Regarding claim 9 and 21, the combination of Kitajima and Du teaches that the optical information signal and the co-launched amplification signal travel in the first direction, further comprising: modulating the non-intensity characteristic of a second optical carrier signal with a second data signal to generate a second optical information signal (reference numeral 13-10a in Figure 32 of Kitajima; reference numeral 320 in Figure 12 of Du); transmitting the second optical information signal over the optical link in a second direction opposite the first direction (Figure 12 of Du); and amplifying the first and second optical information signals over the length of the optical link with the co-launched amplification signal and a counter-launched

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amplification signal traveling in the second direction (reference numeral 240, 400 in Figure 12 of Du).

Regarding claim 11, the combination of Kitajima and Du teaches further amplifying the signal in the optical link with a discrete amplifier (reference numeral 102 in Figure 11 of Kitajima; reference numeral 220 in Figure 12 of Du).

Regarding claim 12, the combination of Kitajima and Du teaches that the discrete amplifying comprises an erbium-doped fiber amplifier (reference numeral 220 in Figure 12 of Du).

4. Claims 7, 10, 19, 22, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitajima in view of Du, and further in view of Ohya (U.S. Patent No. 6,556,327).

Regarding claim 7, 19, and 25, the combination of Kitajima and Du differs from the claimed invention in that it fails to specifically teach that the frequency of the optical carrier signal is modulated with the data signal. However, Ohya, in the same field of optical transmitters, teaches that this concept is well known in the art (Figure 7). One skilled in the art would have been motivated to modulate the frequency of the optical carrier signal with a data signal in order to allow a simpler configuration and to reduce the power consumption in comparison to the phase modulation setup of Kitajima (column 10 lines 19-25 of Ohya). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modulate the frequency of the optical carrier signal with a data signal as taught by Ohya in the system of the combination of Kitajima and Du.

Regarding claim 10 and 22, the combination of Kitajima, Du, and Ohya teaches remodulating the optical information signal with a transmission clock frequency using an

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intensity modulator (reference numeral 30 in Figure 7 in Ohya) to generate a multimodulated signal, transmitting the multimodulated signal over the optical link (reference numeral 101 in Figure 11 of Kitajima); and amplifying the multimodulated signal over the length of the optical link (reference numeral 102 in Figure 11 of Kitajima) with the co-launched amplification signal traveling in the same direction as the multimodulated signal (abstract of Du).

5. Claims 1-5, 7-9, 11-17, 19-21, 23, and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergano (U.S. Patent No. 6,310,709) in view of Du (U.S. Patent No. 6,417,958).

Regarding claim 1, 13, 23, and 26, Bergano teaches modulating a non-intensity characteristic of an optical carrier signal with a data signal (reference numeral 102 in Figure 1) to generate an optical information signal; transmitting the optical information signal over an optical link (e.g. output of phase modulator 108 in Figure 1). Bergano differs from the claimed invention in that Bergano fails to specifically teach amplifying the optical information signal over a length of the optical link with a co-launched amplification signal traveling in a same direction as the optical information signal in the optical link. However, Du, in the same field of optical communication, teaches that it is well known in the art to amplify an optical information signal over a length of an optical link with a co-launched amplification signal traveling in a same direction as the optical information signal in the optical link (see abstract). One skilled in the art would have been motivated to amplify an optical information signal over a length of an optical link with a co-launched amplification signal traveling in a same direction as the optical information signal in the optical link in order to provide for a reduction of signal-pump-signal cross talk (column 3 lines 31-37). Therefore, it would have been obvious to one skilled in the art

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at the time the invention was made to amplify an optical information signal over a length of an optical link with a co-launched amplification signal traveling in a same direction as the optical information signal in the optical link as taught by Du in the system of Bergano.

Regarding claim 2 and 14, the combination of Bergano and Du teaches that the co-launched amplification signal travels at a substantially same speed as the optical information signal (e.g. both signals being light signals, they each travel at the speed of light).

Regarding claim 3 and 15, the combination of Bergano and Du teaches that the co-launched amplification signal comprises a wavelength lower than that of the optical information signal (column 7 lines 32-34 of Du).

Regarding claim 4 and 16, the combination of Bergano and Du teaches that the optical information signal is amplified over the length of the optical link with the co-launched amplification signal by distributed Raman amplification (DRA) (as noted in the abstract and seen in Figure 4 of Du).

Regarding claim 5 and 17, the combination of Bergano and Du teaches generating a plurality of optical information signals (reference numeral 120 in Figure 12 of Du) each comprising a wavelength distinct carrier signal having the non-intensity characteristic modulated with a data signal (reference numeral 102 in Figure 1 of Bergano), multiplexing the plurality of optical information signals to generate a wavelength division multiplexed (WDM) signal (reference numeral 140 in Figure 12 of Du), transmitting the WDM signal over the optical link (reference numeral 160 in Figure 1 of Du); and amplifying the WDM signal over the length of the optical link (reference numeral 220 in Figure 12 of Du) with a plurality of co-launched amplification signals transmitted in the same direction as the WDM signal (see abstract of Du).



Regarding claim 7, 19, and 25, the combination of Bergano and Du teaches that the frequency of the optical carrier signal is modulated with the data signal (reference numeral 102, 104, 106 in Figure 1 of Bergano).

Regarding claim 8 and 20, the combination of Bergano and Du teaches further amplifying the optical information signal over a second length of the optical link with a counter-launched amplification signal traveling in an opposite direction as the optical information signal and the co-launched amplification signal (Figure 13 of Du).

Regarding claim 9 and 21, the combination of Bergano and Du teaches that the optical information signal and the co-launched amplification signal travel in the first direction, further comprising: modulating the non-intensity characteristic of a second optical carrier signal with a second data signal to generate a second optical information signal (reference numeral 102 in Figure 1 of Bergano; reference numeral 320 in Figure 12 of Du); transmitting the second optical information signal over the optical link in a second direction opposite the first direction (Figure 12 of Du); and amplifying the first and second optical information signals over the length of the optical link with the co-launched amplification signal and a counter-launched amplification signal traveling in the second direction (reference numeral 240, 400 in Figure 12 of Du).

Regarding claim 11, the combination of Bergano and Du teaches further amplifying the signal in the optical link with a discrete amplifier (reference numeral 102 in Figure 11 of Bergano; reference numeral 220 in Figure 12 of Du).

Regarding claim 12, the combination of Bergano and Du teaches that the discrete amplifying comprises an erbium-doped fiber amplifier (reference numeral 220 in Figure 12 of Du).

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6. Claims 6, 10, 18, 22, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergano in view of Du, and further in view of Ohya (U.S. Patent No. 6,556,327).

Regarding claim 6, 18, and 24, the combination of Bergano and Du differs from the claimed invention in that it fails to specifically teach that the phase of the optical carrier signal is modulated with the data signal. However, Ohya, in the same field of optical transmitters, teaches that this concept is well known in the art (Figure 7). One skilled in the art would have been motivated to modulate the phase of the optical carrier signal with a data signal in order to allow excellent carrier to noise ratio (column 3 lines 6-14 of Ohya). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modulate the phase of the optical carrier signal with a data signal as taught by Ohya in the system of the combination of Bergano and Du.

Regarding claim 10 and 22, the combination of Bergano and Du teaches transmitting the multimodulated signal over the optical link (reference numeral 101 in Figure 11 of Bergano); and amplifying the multimodulated signal over the length of the optical link (reference numeral 102 in Figure 11 of Bergano) with the co-launched amplification signal traveling in the same direction as the multimodulated signal (abstract of Du), but differs from the claimed invention in that it fails to specifically teach remodulating the optical information signal with a transmission clock frequency using an intensity modulator to generate a multimodulated signal. However, Ohya teaches remodulating the optical information signal with a transmission clock frequency using an intensity modulator (reference numeral 30 in Figure 7 in Ohya) to generate a multimodulated signal. One skilled in the art would have been motivated to do so in order to stabilize the intensity of the transmitted light signal. Therefore, it would have been obvious to

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one skilled in the art at the time the invention was made to remodulate the optical information signal with a transmission clock frequency using an intensity modulator to generate a multimodulated signal.

***Response to Arguments***

7. Applicant's arguments filed 5/4/06 have been fully considered but they are not persuasive. The applicant argues that since Du fails to specifically teach the modulation taught by Kitajima that the two references can not be combined. However, the examiner disagrees. As judicially determined the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

In this case the examiner maintains that the combination of references would have suggested to one of ordinary skill in the art that a co-propagating amplifier such as that taught by Du could have been used in combination with the system of Kitajima with the added benefit of a reduction of signal-pump cross talk. Furthermore, Du specifically notes that the co-propagating amplifier could be used with virtually any WDM system. As such the examiner maintains that the co-propagating amplifier could be used with system of Kitajima.

Next, the applicant argues that the combination of Du and Kitajima fails to specifically teach that the co-launched amplification signal travels at substantially the same speed as the optical information signal. However, the examiner asserts that the speed at which the co-

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launched amplification signal travels at is *substantially* at the same speed as the optical information signal, but not exactly.

Regarding the applicant's argument against the rejection of claim 11, the examiner maintains that the combination of Kitajima and Du when made covers the limitations of this claim.

Next, the applicant argues against the combination of Du and Bergano. The applicant argues that the combination of references and Bergano in particular fails to specifically teach modulating a non-intensity characteristic of an optical carrier. However, the examiner disagrees. As clearly stated in Bergano, the modulator modulates the optical signal at a frequency determined by a clock signal. The examiner believes that this modulation presents a frequency modulation onto the carrier. Furthermore, frequency modulation can be considered a conventional modulation scheme. Given that the applicant has failed to specify a conventional modulation scheme and given the broadest reasonable interpretation of a conventional modulation scheme, it appear that Bergano does indeed teach modulating a non-intensity characteristic of an optical carrier.

8. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir.

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1992). In this case, the examiner has provided motivation in the Du reference for combining the teachings of the prior art.

9. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case the applicant attacks the Du individually without considering what the combination of Du and Kitajima would have suggested to one skilled in the art.

### ***Conclusion***

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (571) 272-3026. The examiner can normally be reached on M-F 8:30-6:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571)272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AB

  
AGUSTIN BELLO  
PRIMARY EXAMINER